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Wind regime of the mesosphere - Lower thermosphere of the Earth

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Abstract

Nowadays investigations of the wind regime of the mesosphere - lower thermosphere (80-100 km) using ground-based (including radiometeor method) and satellite measurements allow the setting and the decision of the task of the creation the global model of the circulation including background motions and temporal variability. The temporal variability is due to the wide spectrum of temporal and spatial scales of waves existing in the atmosphere. Radiosystem of Kazan University is one of 23 meteor radars operating currently in the World. Radiometeor wind measurements in Kazan University started in 1964. During the period of 1964-1965, the first annual cycle of observation is accomplished. Long cycles of observations accomplished during 1979-2002. Uninterrupted cycle of observations started in November 2002 allowed the detailed structure of the temporal variability in the region of the mesosphere - lower thermosphere. Modern methods of the analysis along with background motions allowed the detection of short-period (5-10 minutes) innergravity waves, tidal waves, planetary waves (2-30 days), seasonal variations (annual and semiannual oscillations). Dynamics of this height region of the atmosphere presents significant scientific and practical interests. Due to propagating from the lower atmosphere waves experience the dissipation and the filtration and affects to the altitudinal and seasonal structure of the circulation we should expect the affection of these waves to the disturbed structure of the ionosphere.

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Keywords

Circulation model, Meteor radar, Planetary waves, Prevailing wind, Tides